ZooKeys 2: 175-188 (2008)
doi: 10.3897/zookeys.2.18
www.pensoftonline.net/zookeys

RESEARCH ARTICLE

A peer-reviewed open-access journal
ZooKeys
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Diglotta mersa (Haliday) and *Halobrecta flavipes* Thomson, two new species for the Canadian fauna (Coleoptera, Staphylinidae, Aleocharinae)

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Academic editor: *Christopher G. Majka* | Received 8 June 2008 | Accepted 21 August 2008 | Published 4 September 2008

Citation: Klimaszewski J, Webster R, Assing V, Savard K (2008) *Diglotta mersa* (Haliday) and *Halobrecta flavipes* Thomson, two new species for the Canadian fauna (Coleoptera, Staphylinidae, Aleocharinae). In: Majka CG, Klimaszewski J (Eds) Biodiversity, Biosystematics, and Ecology of Canadian Coleoptera. ZooKeys 2: 175-188. doi: 10.3897/zookeys.2.18

Abstract

Diglotta mersa (Haliday) of the Diglottini, a western Palaearctic species, is reported for the first time from the Atlantic coast of North America (Canada, New Brunswick). It was found in fine gravel under small (10-15 cm diameter) rocks in the intertidal zone, approximately 2 m below the mean high tide mark. A description, and images of the external body, median lobe of aedeagus, spermatheca and terminal segments are provided. New distributional and bionomic data for *Halobrecta flavipes* Thomson, a coastal species of the Athetini Casey, are presented.

Keywords

New records, Canada, Staphylinidae, taxonomy

Introduction

The tribe Diglottini Jacobson, 1909 now includes two genera, *Diglotta* Champion, 1899 and *Paradiglotta* Ashe and Ahn (2004) (Ashe 2001; Caron and Ribeiro-Costa 2008), but is still not well defined. Klimaszewski (1982) also included the genus *Polypea* Fauvel, and Pace (1986) included four additional genera: *Brachypronomaea* Sawada, *Bryothinusa* Casey, *Corallis* Fauvel and *Halorhadinus* Sawada in the Diglottini. Subsequently, the latter genera were transferred to different tribes (Ahn et al. 2003; Ahn and Ashe 2004): *Brachypronomaea* was transferred to the Myllaenini

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Ganglbauer, *Halorhadinus* to the Liparocephalini Fenyes, and *Brachypronomaea*, *Bryothinusa*, and *Polypea* to the Myllaenini. Ashe and Ahn (2004) suggested placing the genus *Corallis* in the Myllaenini but Newton and Thayer (2005) placed it in the Phytosini Thomson. *Paradiglotta* includes only one species, *P. nunni* Ashe and Ahn, from New Zealand (Ashe and Ahn 2004), while *Diglotta* includes eight species (Table 1), two in the western Palaearctic (*D. mersa* Haliday, *D. sinuaticollis* Mulsant and Rey), one in Africa (*D. secqi* Pace), one in Brazil (*D. brasiliensis* Caron and Ribeiro-Costa), four in the Nearctic region (*D. mersa* (Haliday) [Atlantic coast], *D. littoralis* (Horn) [Atlantic coast], *D. legneri* Moore and Orth [Pacific coast]), and *D. pacifica* Fenyes [Pacific coast], and one species, *D. maritima* Lea, in the Fiji Islands (Caron and Ribeiro-Costa 2008; Moore and Orth 1979; Haghebaert 1991; Pace 1986; Ashe 2001).

The objective of this paper is to document the first distribution record of *Diglotta mersa* (Haliday) in North America and to provide new distributional and bionomic data on another coastal species, *Halobrecta flavipes*, previously recorded in North America from New York and Virginia (Gusarov 2004).

Material and methods

Thirty-nine adults of *D. mersa* from Dipper Harbour, and fifty-seven specimens of *H. flavipes* from Chance Harbour, New Brunswick, were examined. Twelve specimens of *D. mersa* were dissected. The genital structures were dehydrated in absolute alcohol and mounted in Canada balsam on celluloid microslides and pinned with the specimens from which they originated. The photographs of the entire body and the genital structures were taken using an image processing system (Nikon SMZ 1500 stereoscopic microscope; Nikon Digital Camera DXM 1200F; and Adobe Photoshop software).

Terminology mainly follows that used by Caron and Ribeiro-Costa (2008). The ventral part of the median lobe of the aedeagus is considered to be the part of the bulbus containing the foramen mediale, the entrance of the ductus ejaculatorius, and the adjacent venter of the tubus; the opposite side is referred to as the dorsal part.

Depository abbreviations:

LFC Natural Resources Canada, Canadian Forest Service, Laurentian Forestry Centre, Insectarium R. Martineau, Quebec City, Quebec, Canada

MCZ Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA

RWC Reginald Webster private collection, 24 Millstream Drive, Fredericton, New Brunswick, Canada

Table 1. World checklist of *Diglotta* species. New record is in bold.

Species	Original combination	Synonyms	Distribution	Source	Tarsal formula
Diglotta mersa (Haliday)	*Diglossa mersa* Haliday, 1837	*Diglotta crassa* (Mulsant & Rey) *Diglotta submarina* (Fairmaire & Laboulbène)	Europe (Albania, Belgium, Denmark, France, Germany, Great Britain, Ireland, Netherlands) **North America (Canada: New Brunswick)**	Haghebaert (1991); Smetana (2004)	4-4-4
Diglotta sinuaticollis (Mulsant & Rey)	*Diglossa sinuaticollis* Mulsant & Rey, 1870		Europe (Belgium, Denmark, France, Great Britain, Germany, Ireland, Netherlands, Norway, Spain, Sweden); North Africa (Algeria)	Smetana (2004)	4-4-4
Diglotta secqi Pace			Africa (Djibouti)	Pace (1989)	4-4-4
Diglotta littoralis (Horn)	*Phytosus littoralis* Horn, 1871		North America (New Jersey)	Horn (1871); Haghebaert (1991)	4-4-5
Diglotta legneri Moore & Orth	*Diglotta legneri* Moore & Orth, 1979		North America (California)	Moore and Orth (1979); Haghebaert (1991)	4-4-5
Diglotta pacifica Fenyes	*Diglotta pacifica* Fenyes, 1921		North America (California, Oregon)	Fenyes (1921); Haghebaert (1991)	4-4-5
Diglotta brasiliensis Caron & Ribeiro-Costa	*Diglotta brasiliensis* Caron & Ribeiro-Costa, 2008		South America (Brazil, Paraná)	Caron and Ribeiro-Costa (2008)	4-4-4
Diglotta maritima Lea	*Diglossa maritima* Lea, 1927		Fiji Islands (Levuka)	Lea (1927); Haghebaert (1991)	4-4-5

Tribe Diglottini Jakobson 1909

Diagnosis

Tarsal formula 4-4-5 (most North American species) or 4-4-4 (European, African and Brazilian species) (Lohse 1974; Haghebaert 1991; Ashe 2001; Caron and Ribeiro-Costa 2008); claws strong, scythe-like; glossae thin and extremely elongate, protruding beyond labrum (*Myllaena*-like); labial palpi thin, strongly elongate, and stylate (Fig. 1); maxillae elongate, maxillary lobes long, with scattered teeth on lacinia (Fig. 1); eyes small (Fig. 1); body form distinct (Fig. 1).

Genus *Diglotta* Champion 1899

Diglotta Champion, 1899: 264. Type species *Diglossa mersa* Haliday, 1837.

Diagnosis

Integument with slightly granulate microsculpture, pubescent, pubescence short and of distinct pattern on pronotum with microsetae forming arcuate lines emerging from midline of the disc outwards (Fig. 1). Body with large, broadly rounded head and protruding mouthparts forming conically-shaped apical projection, head as large as or larger than pronotum (Fig. 1); infraorbital carinae absent; labrum broadly emarginate medially; mandibles slender with rounded blunt apices, prostheca well developed; lacinia and galea of equal length; maxillary palpus with four articles, first and last reduced in size; mentum trapezoidal in shape, anterior margin strongly concave; pronotum strongly narrowed basally (Fig. 1); elytra shorter than pronotum (Fig. 1); hind wings usually reduced to short stubs, but micropterous and macropterous forms within the same species are reported (Good 1998); abdomen broadly oval in dorsal outline and widening posteriorly (Fig. 1). Found in the intertidal zone of beaches (Moore and Orth 1979; Good 1998; Haghebaert 1991; Pace 1989, Ashe 2001).

Key to the *Diglotta* species recorded from the Nearctic region

The following key was modified from Haghebaert (1991). Elytral length was measured from the humeral angle to the hind margin; body length was measured from the apical margin of the labrum to the apex of the abdomen. The body length is given without range for species known only from a holotype (*D. littoralis*), or where such data was not available from the literature. For descriptions and genital illustrations of *D. legneri*, *D. littoralis* and *D. pacifica* see Haghebaert (1991).

1. Metatarsus with 4 articles (tarsal formula 4-4-4); elytra at least as long as pronotum; Atlantic coast of Canada .....*D. mersa* (Haliday) [Figs. 1-11]
– Metatarsus with 5 articles (tarsal formula 4-4-5); elytra shorter than pronotum; Atlantic or Pacific coast of North America.....2
2. Body brownish, length 2.6 mm; antennae elongate; Pacific coast.....
.....*D. legneri* Moore & Orth

Fig. 1. *Diglotta mersa* (Haliday) in dorsal view. Scale bar = 1 mm.

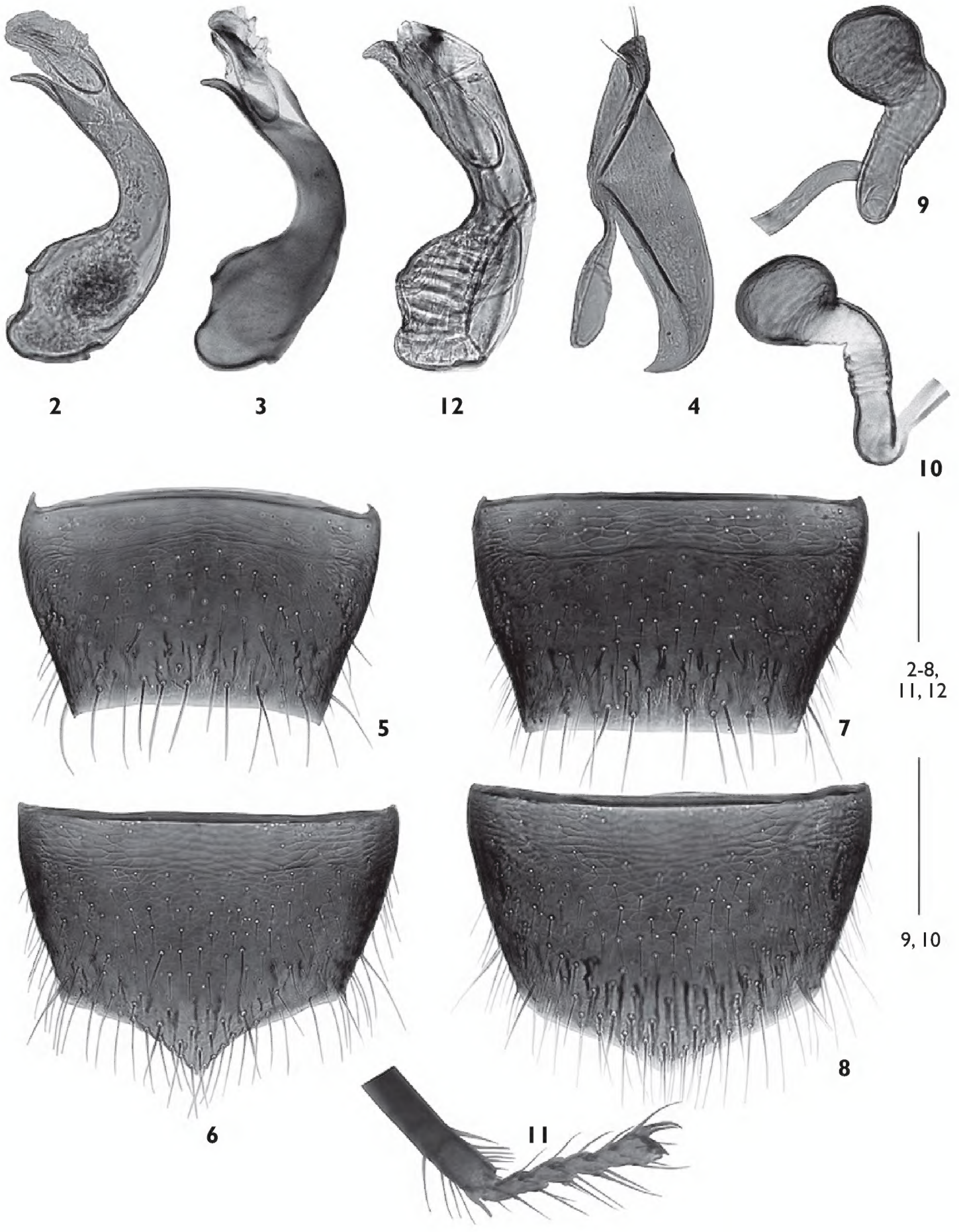
– Body brown to light testaceous, length less than 2.0 mm; antennae short; Atlantic or Pacific coast 3
3. Head slightly broader than long; punctation finely asperate; colour light testaceous; body length 1.8 mm; Atlantic coast ..... *D. littoralis* (Horn)
– Head one third broader than long, punctation coarse and dense; colour brownish; body length 1.5 mm; Pacific coast ..... *D. pacifica* Fenyes

***Diglotta mersa* (Haliday)**
(Figs. 1-14)

Diglossa mersa Haliday, 1837: 252; Good 1998: 74; Smetana 2004: 421.
Diglossa crassa Mulsant and Rey, 1870: 180; Smetana 2004: 421.
Diglossa submarina (Fairmaire and Laboulbène, 1856: 468). Lohse 1974: 20; Lohse 1985; Lohse and Lucht 1989: 115; Good 1998: 74; Smetana 2004: 421.

Description
Body length 1.9-2.1 mm, body width 0.2-0.3 mm; dark brown to almost black, with tarsi, apical portions of tibiae and apical two articles of maxillary palpi yellowish brown, abdomen slightly darker than remainder of body (Fig. 1); metatarsus with 4 tarsomeres (Fig. 11). Pubescence short and moderately dense, yellowish grey in artificial light. Antennae with scape elongate and as long as pedicel, about 3 times as long as wide, antennomere 3 about twice as long as wide, antennomeres 4-7 approximately subquadrate, 8-10 slightly transverse, and 11 twice as long as preceding article (Fig. 1). MALE. Tergite 8 transverse, truncate apically, antecostal suture slightly pointed medially (Fig. 5). Sternite 8 transverse, strongly produced apically, antecostal suture approximately straight (Fig. 6). Paramere with moderately long apical lobe, its apex rectangular, two macrosetae present in subapical part (Fig. 4). Median lobe of aedeagus with relatively large bulbus bearing narrow crista apicalis, tubus narrowly elongate, arched and with apical part narrow and slightly pointed ventrally, internal sac with subapical sclerites (one visible in lateral view) hooked apically (Figs. 2, 3). FEMALE. Tergite 8 similar to that of male (Fig. 7). Sternite 8 transverse and broadly rounded apically (Fig. 8). Spermatheca with spherical capsule connected to a narrow and slightly elbowed stem (Figs. 9, 11).

Distribution
Diglotta mersa has previously been reported from coastal areas of Europe: Albania, Belgium, Denmark, France, Great Britain, Germany, Ireland, Italy and the Netherlands (Smetana 2004), but due to previous species misinterpretation (Good 1998), the distribution in the Western Palaearctic requires revision. We report this species for the first time from the Atlantic coast of North America (Canada: New Brunswick). *Diglotta mersa* is wing-dimorphic and both winged and wingless forms have been reported in Europe (Good 1998). These observations suggest that the species is capable of long-distance dispersal and may be adventive on the Atlantic coast of North America.



Figs. 2-12. *Diglotta mersa* (Haliday): 2, median lobe of aedeagus in lateral view (New Brunswick); 3, median lobe of aedeagus in lateral view (Europe); 4, paramere (New Brunswick); 5, male tergite 8 (New Brunswick); 6, male sternite 8 (New Brunswick); 7, female tergite 8 (New Brunswick); 8, female sternite 8 (New Brunswick); 9, spermatheca (New Brunswick); 10, spermatheca (Europe); 11, metatarsus with 4 articles (New Brunswick); 12, median lobe of the aedeagus of the holotype of *D. littoralis* in lateral view. Scale bars = 0.1 mm.

Collection data

Sixteen specimens were captured on 12 May 2008 on fine gravel under or adjacent to 10-15 cm rocks in the intertidal zone, approximately 2 m below the mean high tide mark (Figs. 13, 14). Rocks at this site were largely free of algae. An additional 24 specimens were found in July on sea beaches under 10-30 cm diameter rock in sand, about 4.0 m below mean high tide mark, and under 10-80 cm diameter rocks in sand, 2.0 to 5.0 m below mean high tide mark.

Material examined

CANADA, New Brunswick: Charlotte Co., Maces Bay, 45°.1242 N, 66°.4732 W, 11 July 2008, R. P. Webster, coll., sea beach, intertidal zone, under 10 cm diameter rock in sand, about 4.0 m below mean high tide mark (RWC), 1 sex undetermined; Charlotte Co., St. Andrews, 45°.0751 N, 67°.0370 W, 12 July 2008, R. P. Webster, coll., sea beach, intertidal zone, under 30 cm diameter rock in sand, about 4.0 m below mean high tide mark (RWC), 1 sex undetermined; Saint John Co., Dipper Harbour, 45.1154° N, 66.3720° W, 12 May 2008, leg. R.P. Webster, sea beach, intertidal zone, under rock on fine gravel, approximately 2 m below mean high tide mark (LFC, RWC), 6 males, 6 females, 4 sex undetermined; Saint John Co., Chance Harbour off Cranberry Head Road, 45°.1348 N, 66°.3438 W, 6 July 2008, R. P. Webster, coll., sea beach, intertidal zone, under 10-80 cm diameter rocks in sand, 2.0 to 5.0 m below mean high tide mark (LFC, RWC), 21 sex undetermined.

Comments

The median lobe of the aedeagus of the holotype of *Diglotta littoralis* (Horn) is illustrated in Fig. 12. This is the only other species of the genus occurring on the Atlantic coast of North America and it is known only from the holotype, which was collected in New Jersey. The median lobe of this species is presented here for the first time.

***Halobrecta flavipes* Thomson, 1861**

(Figs. 13, 14, 15-22)

Description

A description of *Halobrecta flavipes* Thomson is given in Klimaszewski et al. (2002) and Gusarov (2004). This marine littoral species has been previously recorded from the coasts of Europe (Smetana 2004), Inaccessible Islands, Chile, and the United States (New York, Virginia) (Klimaszewski et al. 2002; Gusarov 2004). We report this species for the first time for New Brunswick, Canada, from specimens collected in the intertidal and littoral zones.

Collection data

CANADA, New Brunswick: Charlotte Co., Maces Bay, 45°.1242 N, 66°.4732 W, 11 July 2008, R. P. Webster, coll., sea beach, intertidal zone, under 10-30 cm diameter

Fig. 13. Habitat of *D. mersa* and *H. flavipes* (Chance Harbour, New Brunswick).

Fig. 14. Habitat of *D. mersa* and *H. flavipes* (near Dipper Harbour, New Brunswick).

Fig. 15. *Halobrecta flavipes* Thomson in dorsal view. Scale bar = 1 mm.

rocks in fine gravel/clay mix, about 4.0 m below mean high tide mark (RWC), 2 sex undetermined; Saint John Co., Black Beach, 45°.1539 N, 66°.2282 W, 11 July 2008, R. P. Webster, coll., sea beach, intertidal zone, under 20 cm diameter rock in fine gravel about 3.0 m below mean high tide mark (RWC) 1 sex undetermined; Saint John Co., Chance Harbour off Cranberry Head Road, 45°.1348 N, 66°.3438 W, 6 July 2008, R. P. Webster, coll., sea beach, intertidal zone, under 30-80 cm diameter rocks in fine gravel/clay mix, 3.0 to 5.0 m below mean high tide mark (LFC, RWC), 8 sex undetermined.

Saint John Co., Chance Harbour, 45.1156° N, 66.3610° W, 7 May 2006, leg. M. Giguère and R. Webster, sea beach, in decaying seaweed near mean high tide mark (RWC), 2 females, 1 male; Chance Harbour off Cranberry Head Road, 45.1348° N, 66.3438° W, 12 May 2008, leg. R. P. Webster, sea beach, intertidal zone, under large (30-80 cm) deep-set rocks (covered with *Ascophyllum nodosum* (Linnaeus) Le Jolis, Phaeophyceae, Fucales) in gravel/clay soil about 3 to 3.5 m below mean high tide mark (LFC, RWC), 5 males, 3 females, 40 sex undetermined; Dipper Harbour, 45.1154° N, 66.3720° W, 12 May 2008, leg. R.P. Webster, sea beach, intertidal zone, under deep-set rock on fine gravel, approximately 2 m below mean high tide mark (RWC), 1 male.

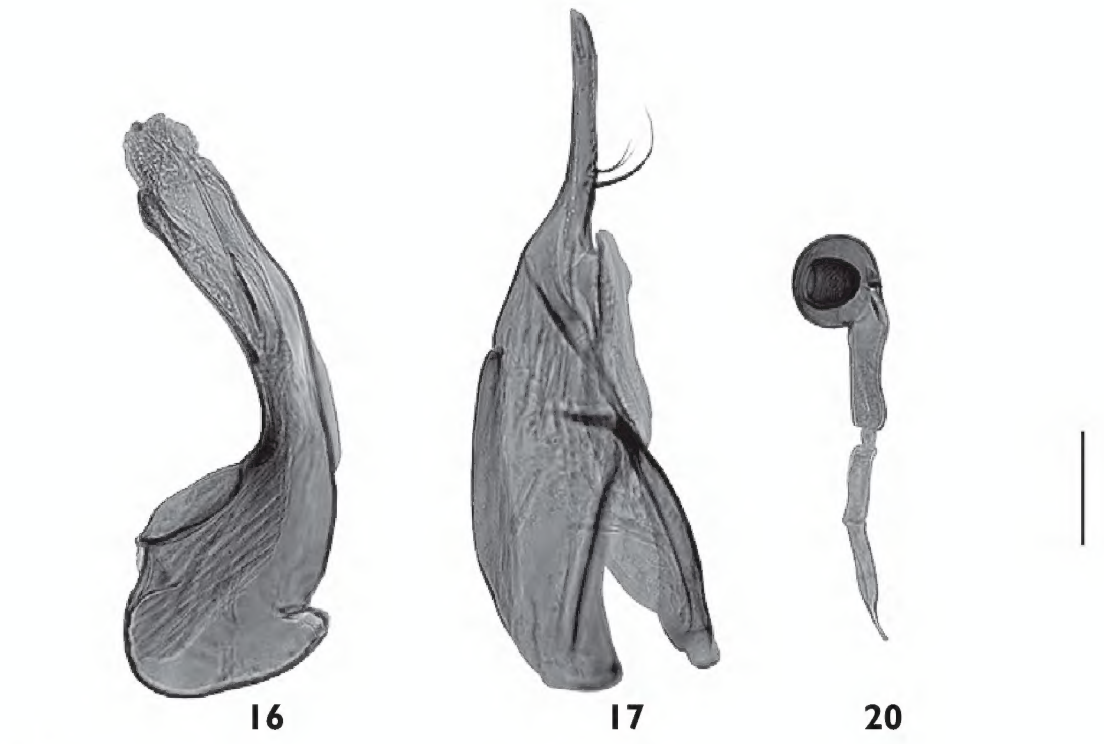
Bionomic notes

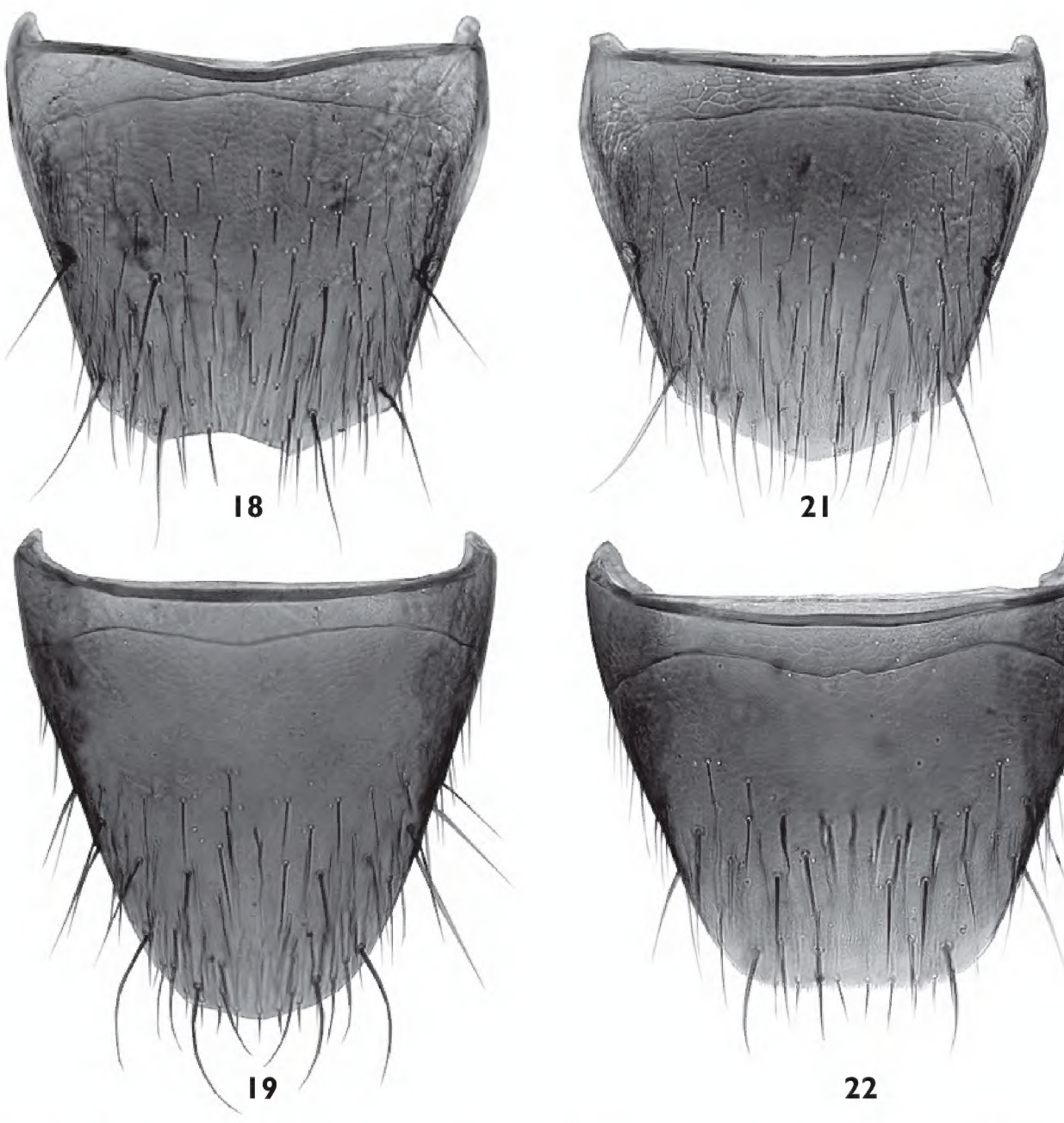
Fifty-seven adults of *H. flavipes* were collected from under large deep-set rocks 3.0 to 3.5 m below the mean high tide mark at Chance Harbour in May and July 2008. Many other adults were observed under rocks on these dates. *Micralymma marinum* (Ström) (Staphylinidae, Omalinae) was also common under deep-set rocks at this site, but a few individuals were also observed on the surface of the gravel adjacent to the rocks. Mating pairs of *M. marinum* were also observed under the rocks. Three adults of *H. flavipes* were found under decaying seaweed near the mean high tide mark on 7 May 2006. However, no adults were observed in decaying seaweed or other drift material near the mean high tide mark in 2008.

Discussion

Haghebaert (1991) divided *Diglotta* into two groups based on the tarsal formula, the West Palaearctic species, African species, and Brazilian species (Caron and Ribeiro-Costa 2008) having 4-4-4-articulated tarsi (metatarsus with 4 articles), and the Nearctic and Fiji Islands species having 4-4-5-articulated tarsi (metatarsus with 5 articles). It is noteworthy that the Brazilian species has a tarsal formula of 4-4-4 while all native North American species have 4-4-5-articulated tarsi. The tarsal articulation of all known *Diglotta* species should be reexamined and confirmed. Based on such a reexamination, the two groups will probably warrant distinct taxonomic status.

Based on the available zoogeographic data, an explanation of the presence of *D. mersa* in New Brunswick may seem somewhat speculative. However, because the species is wing-dimorphic (Good 1998), and due to the absence of its previous records





Figs. 16-22. *Halobrecta flavipes* Thomson: 16, median lobe of aedeagus in lateral view (New Brunswick); 17, paramere (New Brunswick); 18, male tergite 8 (New Brunswick); 19, male sternite 8 (New Brunswick); 20, female tergite 8 (New Brunswick); 21, female sternite 8 (New Brunswick); 22, spermatheca (New Brunswick). Scale bar = 0.1 mm.

in North America, it is plausible to believe that the North American population originated in Europe.

Acknowledgements

The first author thanks his research director G. Daoust (LFC) for supporting this project under biodiversity research, P. Cheers, English Editor (LFC) for editing the first draft of the manuscript and D. Paquet (LFC) for formatting the manuscript. We are grateful to Jon Sweeney for his useful comments on the manuscript. We appreciate the assistance of Ph. Perkins (MCZ) who loaned us the holotype of *D. littoralis*.

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